

UP CLOSE

Try these riddles: How are a baseball, a flower, a brick, and a nail alike? How is water like oil and vinegar? How is air like helium? How is what's in a fluorescent lightbulb like lightning? Here are the answers:

Solids

➤ **IF MATTER IS A** solid object, it maintains its own shape. Take rocks, for example. A rock is a solid object. It keeps its shape unless it is crushed or something else happens to it. The reason has to do with molecules. The molecules in solids are not free to move about, which is why



solids keep their shape. Plus, the molecules are tightly packed. That's why solids

are hard. The more tightly packed the molecules are, the harder the solid.

➤ **AEROGEL, ALSO** known as frozen smoke, looks like smoke but feels like Styrofoam. More than 99 percent air, aerogel is the lightest of all solids. In spite of its airy makeup, aerogel is great in cold weather because it acts as insulation against extreme temperatures. It has been used for



everything from insulating space rovers exploring Mars to lining parkas and boots.

Between a liquid and a solid...

➤ **LIQUID CRYSTALS** are between a liquid and a solid. The molecules in liquid crystals are more organized and fixed than in true liquids but not as fixed as in

solid crystals. As a result, their arrangement can be easily changed. We can see the effect of the change when a small amount of electricity passes

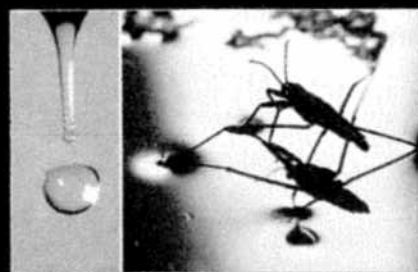
through a liquid crystal and causes it to become dark. The arrangement of light and dark crystals gives the different numeric readouts on digital clocks.



Liquids

▼ **IF IT FLOWS, IT'S A** liquid. Think of water coming out of a hose. Like all liquids, the water changes shape. If it spills onto the ground, it spreads out. If it flows into a container, such

as a bucket or a pool, it takes the shape of the container. The molecules that make up liquids are close together, like the molecules in solids, but they have more energy. As a result, the molecules of the liquid are in motion. The motion of the molecules is what makes the shape of liquids changeable.



▲ **WHY ARE DROPS** of water round? The molecules of a liquid cohere, or stick together. The ones on the surface are drawn to the ones at the center of the liquid. As a result, the liquid tends to form into the shape of a ball or,

as we say, a drop. When liquid fills a glass, cohesion gives the top surface a kind of skin. No wonder a paper clip can float on water and some insects can walk on water. They're floating and walking on the water's "skin."



▲ **WHAT MAKES** something wet? A solid is wet when the molecules of a liquid are attracted to the molecules of the solid and cling to it. This blade of grass looks wet because dew-drops, made of water molecules, are clinging to it.

